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RESEARCH NOTE

Variation of different physiological and yield related traits in rice (*Oryza sativa* L.)

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Rice grain yield is a quantitative polygenic character and highly influenced by environment. Extent and significance of association of yield with yield components should be considered, while determining the selection criteria of germplasm on the basis of available genetic variation plant height ranged from 84.60 to 148.62, panical length ranged from 20.76 to26.93, grain per panical ranged from 125 to 210 cm, yield per plant ranged from 13.36 to 22.77 g and test weight ranged from 26.83 to 28.64 .

Key words : Variation, Physiological, Yield

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Rice (*Oryza sativa* L.) which belongs to the family of grasses, Poacea, is the main food source for more than two-third of the world's population (Sasaki and Burr, 2000), especially in Southeast Asia (Nwugo and Huerta, 2011 and Wang *et al.*, 2011). Globally, it is cultivated in an area of 153.51 m ha with an annual production of about 650.19 million tonnes and an average productivity of 2.96 t ha^{-1} (FAO, 2013). Among the rice producing countries, India ranks second in total production (90.00 million tonnes) next to China (184.25 million tonnes) with an average productivity of 3.09 t/ ha^{-1} (FAO, 2013). Rice grain is rich in vitamin B, vitamin E, protein, unsaturated fat, minerals, carbohydrates and dietary fibre. The endosperm constitutes the largest part of the grain. It is composed chiefly of carbohydrates in the form of starch, with some incomplete protein and traces of vitamins and minerals. Bran which covers the grains is composed primarily of carbohydrate cellulose with traces of vitamin B (including thiamine, niacin and B-6), minerals (including iron, phosphorus, magnesium and potassium) and incomplete proteins. The outer husk or hull is inedible but is often used for fuel or fertilizer (Wu *et al.*, 2003).

Rice grain yield is a quantitative polygenic character and highly influenced by environment. Extent and significance of association of yield with yield components should be considered, while determining the selection criteria of germplasm on the basis of available genetic variation (Habib *et al.*, 2005). The success of breeding program also depends upon the amount of genetic variability present in the population and extent to which the desirable traits are heritable. Different morphological traits play very important role for more rice production with new plant type characteristics associated with the plant yield (Yang *et al.*, 2007 andYang and Hwa, 2008). Phonological properties of rice also associated with the yield potential of the different rice varieties for the selection of the best varieties that further involved in rice breeding programme (Shahidullah *et al.*, 2009).

This study comprised of 6 varieties/lines *i.e.*, Sarjoo-52, Madhukar,NDR-359, CSR-13,Swarna Sub-1, Swarna. All the material was obtained from Narendra Deva

University of Agriculture and Technology Kumarganj, Faizabad Uttar Pradesh. All the seeds were soaked in water at 30^{0}C for two days. The soil was also well prepared for the growing of rice nursery. The sandy clay loam soil was used for this purpose. The seeds of each genotype were sown separately in different blocks through broadcasting method. Rice nursery was used for transplanting within 25 to 40 days after the date of sowing. The nursery of all the rice genotypes was transplanted in the field using Randomized Complete Block Design (RCBD) with three replications and 5 row sub plot of each progeny. The plants were spaced 20 cm row to row and 15 cm plant to plant. Herbicides were used for the controlling of weeds. Agrochemicals were also used for the controlling insect pest and diseases. Some morphological traits were measured at the physiological maturity stage taking 10 plants from each genotype. Plant height was measured in cm from the plant base to the tip of the highest leaf (or panicle, whichever was longer). Productive tillers of each plant were counted to determine the total number of panicles in each plant. The panicle length of the central tiller of the each plant was measured in cm. The leaf breadth and length was measured in centimeter of main tiller of each plant of the flag leaf with respect to the each genotype. The spikelet's per panicle of main tiller of each plant were counted at maturity stage, seeds per panicle of main tiller of each plant was counted separately after harvesting, Seed weight per panicle of main tiller of each plant was measured in grams after harvesting. The 1000 seed weight of each genotype was measured after harvesting. The whole plant yield of each genotype was measured in grams after harvesting of each genotype, days to heading of each genotype was determined when 50 per cent plants of an entry have shown ear emergence starting from the date of sowing and days to maturity of each genotypes was determined at the maturity stage when 50 per cent plants of an entry have matured starting from the date of sowing.

This study consisted on two parts; first we studied the various morphological traits of the forty rice genotypes and secondly we studied the seed traits of the selected genotypes based on the yield and yield contributing traits. Some of the genotypes having more contribution in yield and yield related traits. These results are in good agreement with some earlier findings reported by other scientist (Cheema *et al*., 2004; Bose and Pradhan, 2005 and Shahidullah *et al*., 2009). Plant height ranged

Table 1: Variation of different physiological and yield related traits in rice

Sr. No.	Genotypes	Plant hight (cm)	Panicle length (cm)	Grain per panicle	Harvest index	Biological yield (g)	Seed length (mm)	Seed breath (mm)	Yield/ plant(g)	Test weight (g)
1.	Sarjoo-52	91.60	20.76	210.00	49.17	41.62	9.08	2.04	20.46	27.07
2.	Madhukar	148.62	23.00	146.00	48.80	46.70	8.82	2.16	22.77	28.59
3.	NDR-359	101.52	26.93	188.00	45.61	41.91	10.03	2.14	19.12	27.24
4.	CSR-13	94.89	21.83	125.00	36.57	36.50	10.58	1.99	13.36	28.64
5.	Swarna sub-1	84.60	24.23	198.00	41.21	42.73	7.45	1.88	17.62	26.83
6.	Swarna	86.62	24.76	200.00	42.48	40.58	7.58	1.94	17.20	26.84
S.E.±		1.05	0.34	2.93	1.32	0.78	0.02	0.02	0.56	0.78
C.D.(P=0.05)		3.30	1.09	9.23	4.17	2.47	0.06	0.07	1.77	2.47

from 84.60 to 148.62, panical length ranged from 20.76 to26.93, grain per panical ranged from 125 to 210 cm. The genotypes, which having better yield and yield contributing traits and also having a great genetic diversity yield per plant ranged from 13.36 to 22.77 g, test weight ranged from 26.83 to 28.64. Similar finding was reported by Ashfaq *et al*. (2012) and Li *et al.*(2011).

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